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Ferrell et al.

(54) **SINGLE STRIP - DOUBLE WEB CEILING GRID MEMBER**

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(60) Provisional application No. 60/751,866, filed on Dec. 20, 2005, provisional application No. 60/705,758, filed on Aug. 5, 2005.

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E04B 1/38	(2006.01)

(52) **U.S. Cl.** **52/506.05**; 52/506.07

(57) **ABSTRACT**

A runner for a suspended ceiling grid is roll-formed from a single strip of sheet metal so as to have a generally symmetrical appearance about a vertical center line, with a double vertical web and a double-thickness flange for supporting ceiling tiles. The bottom surface of the flange is continuous across its exposed surface, so that there is no visible juncture of the opposed flanges with the double web when viewed from below, thus providing an aesthetically more-pleasing appearance.

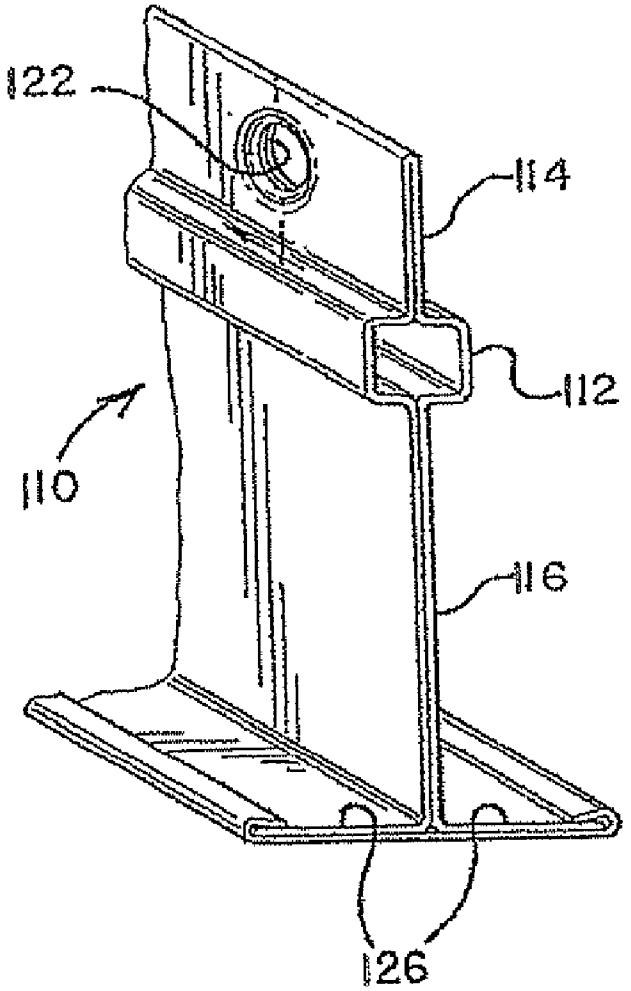


FIG. 3

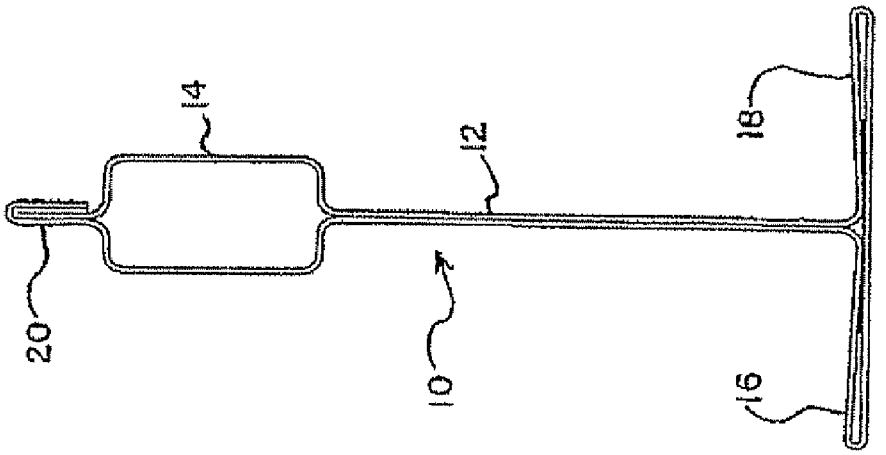


FIG. 2

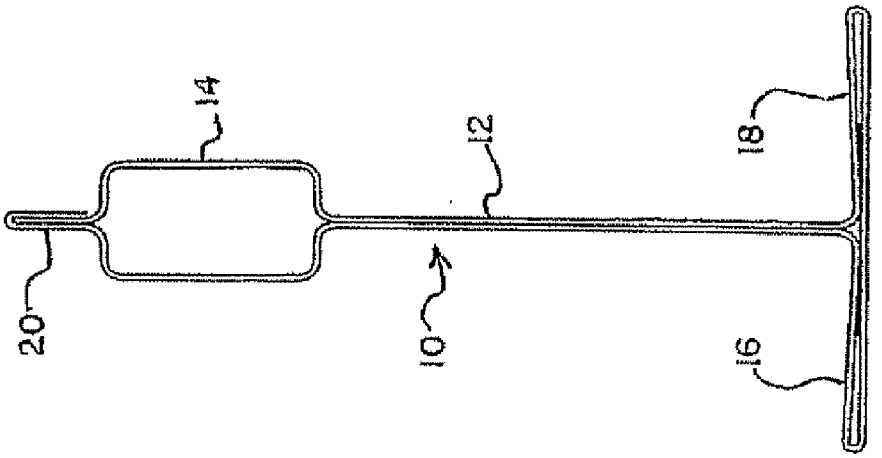


FIG. 1

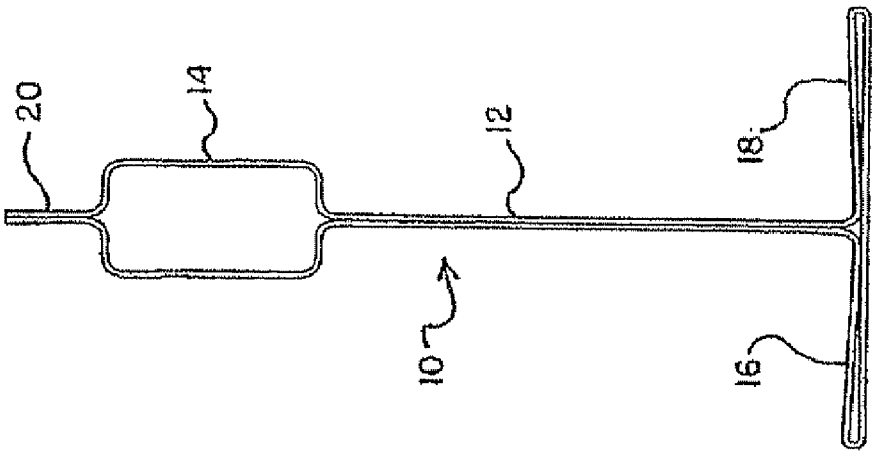


FIG. 6

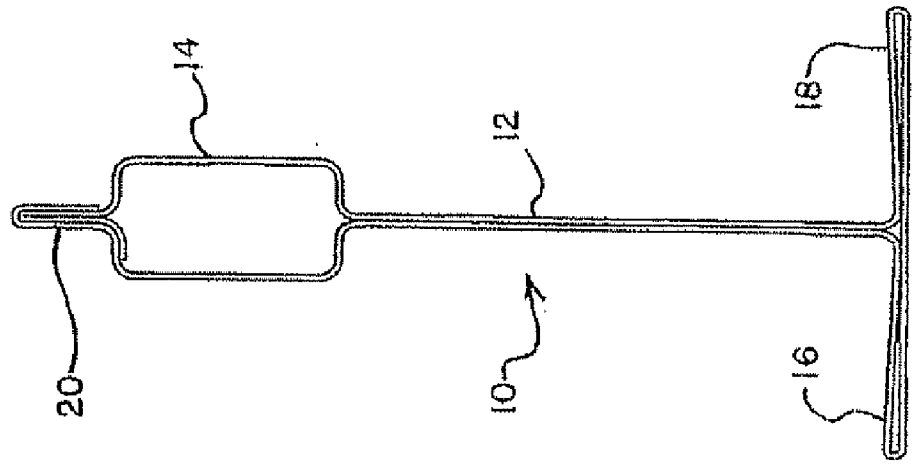


FIG. 5

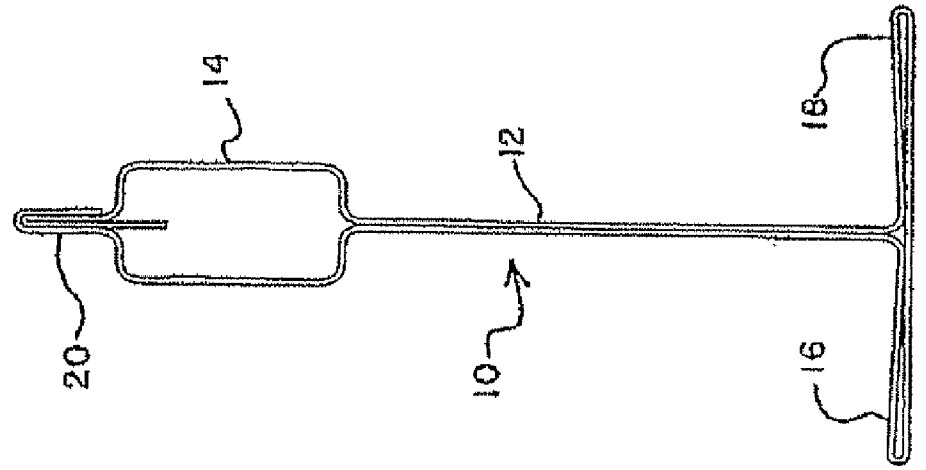


FIG. 4

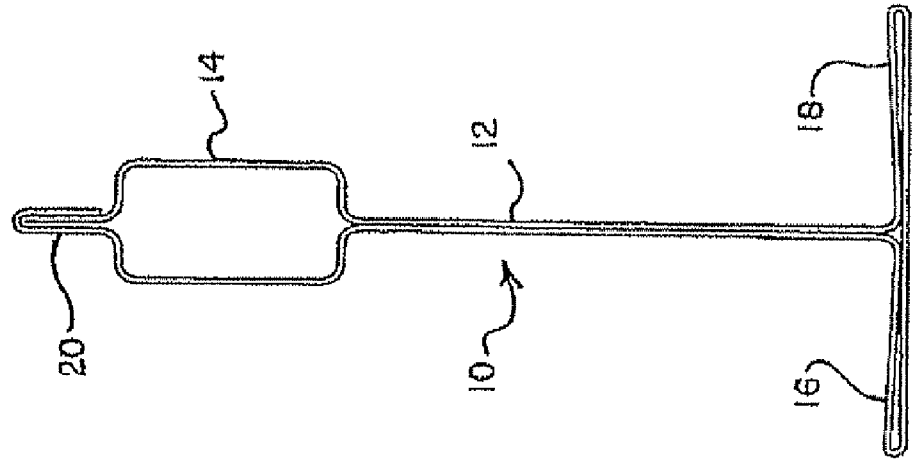


FIG. 9

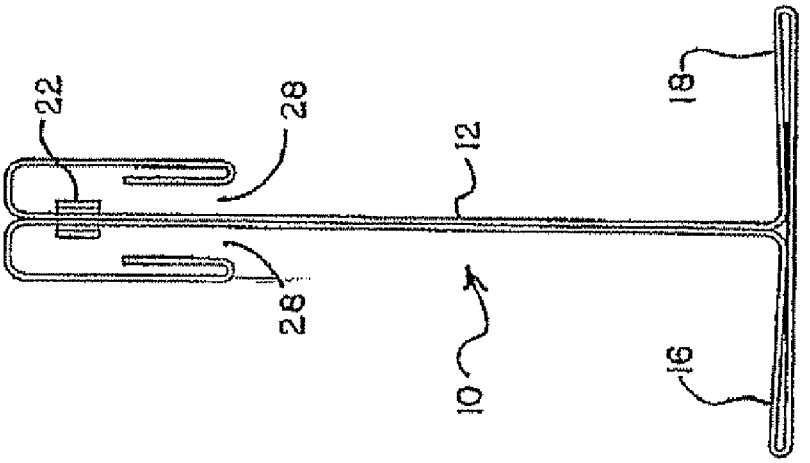


FIG. 8

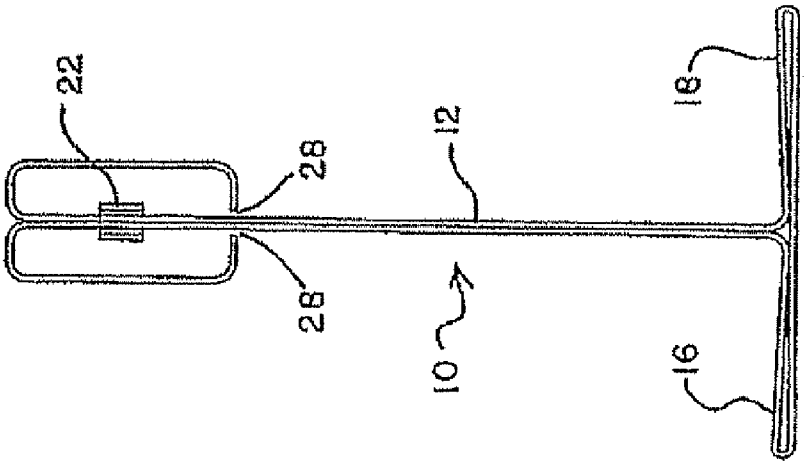


FIG. 7

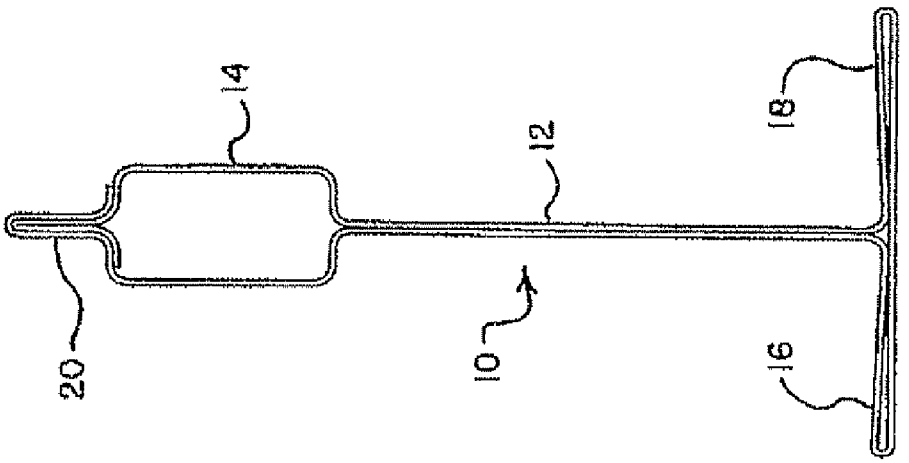


FIG. 10

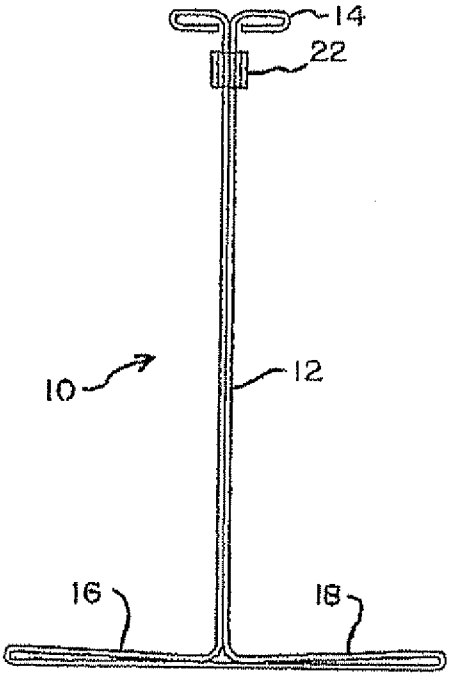


FIG. 11

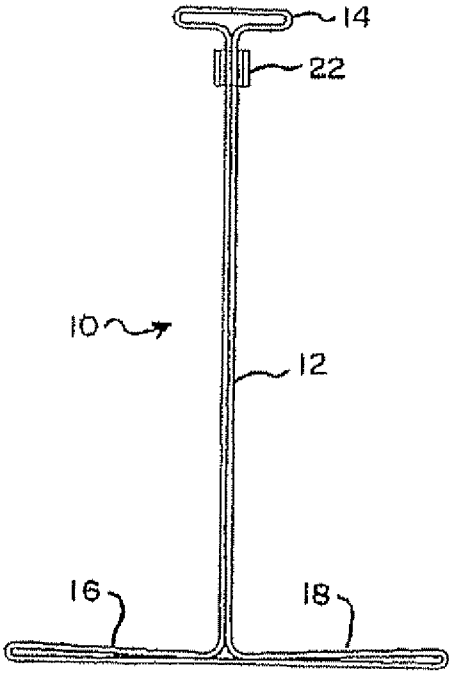


FIG. 12

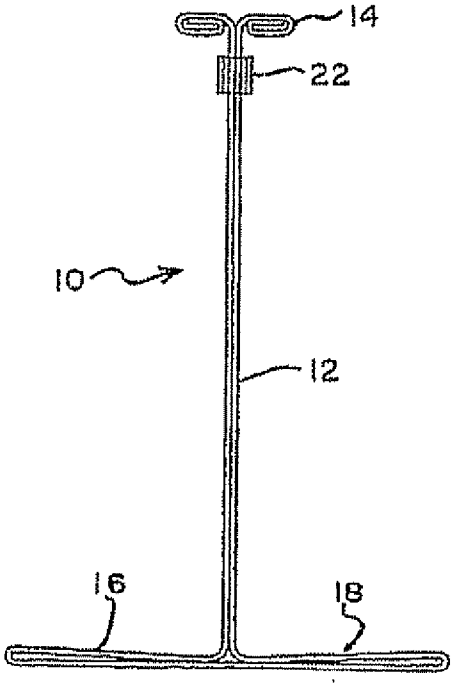


FIG. 13

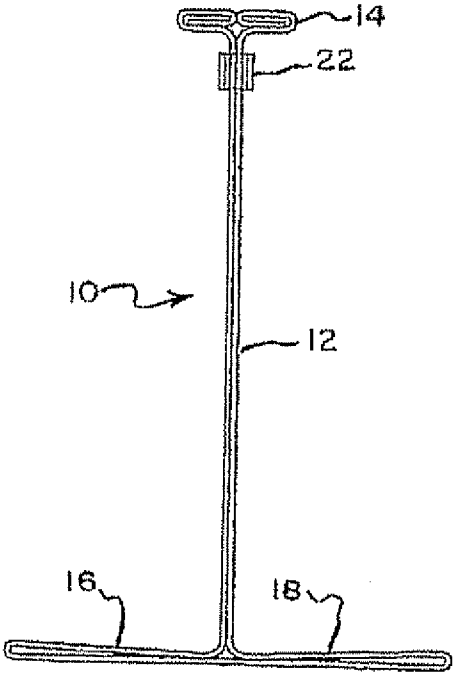


FIG. 14

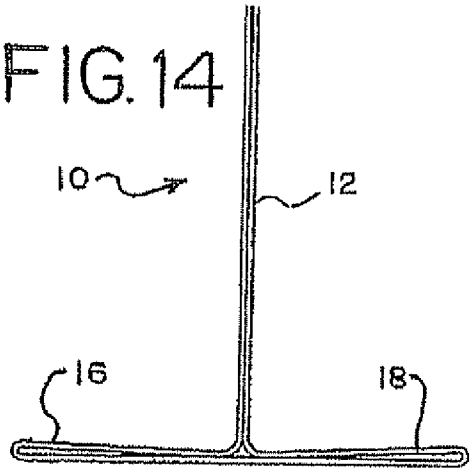


FIG. 14A

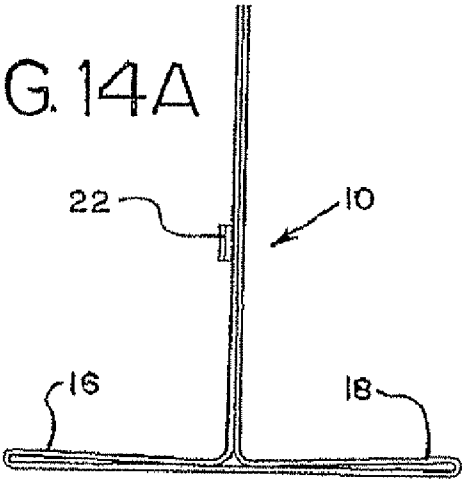


FIG. 15

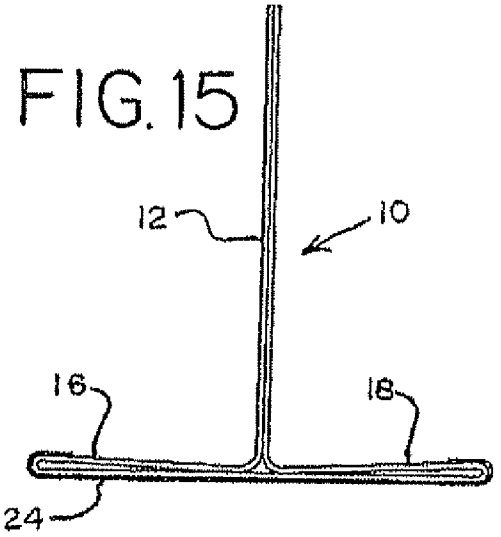


FIG. 15A

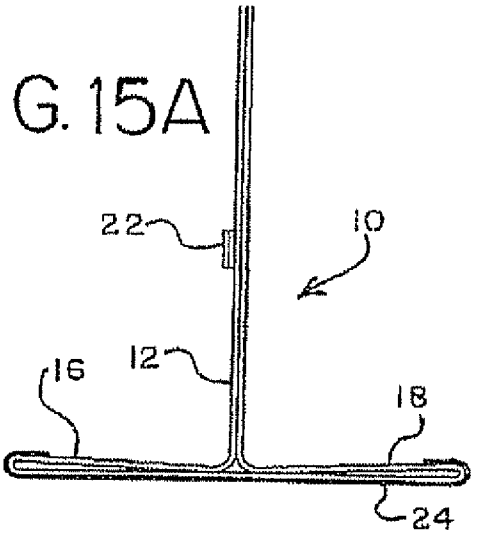


FIG. 16

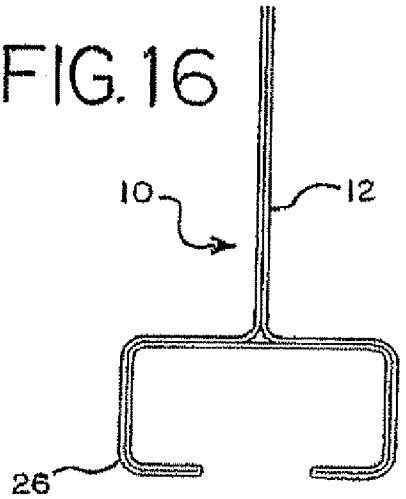


FIG. 16A

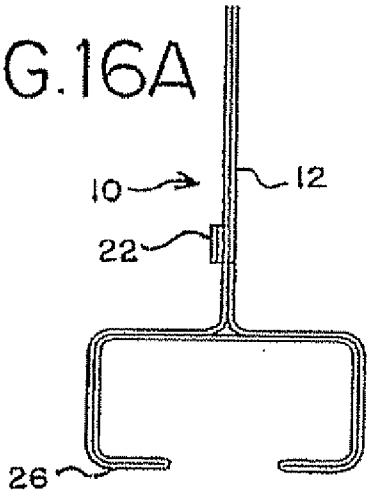
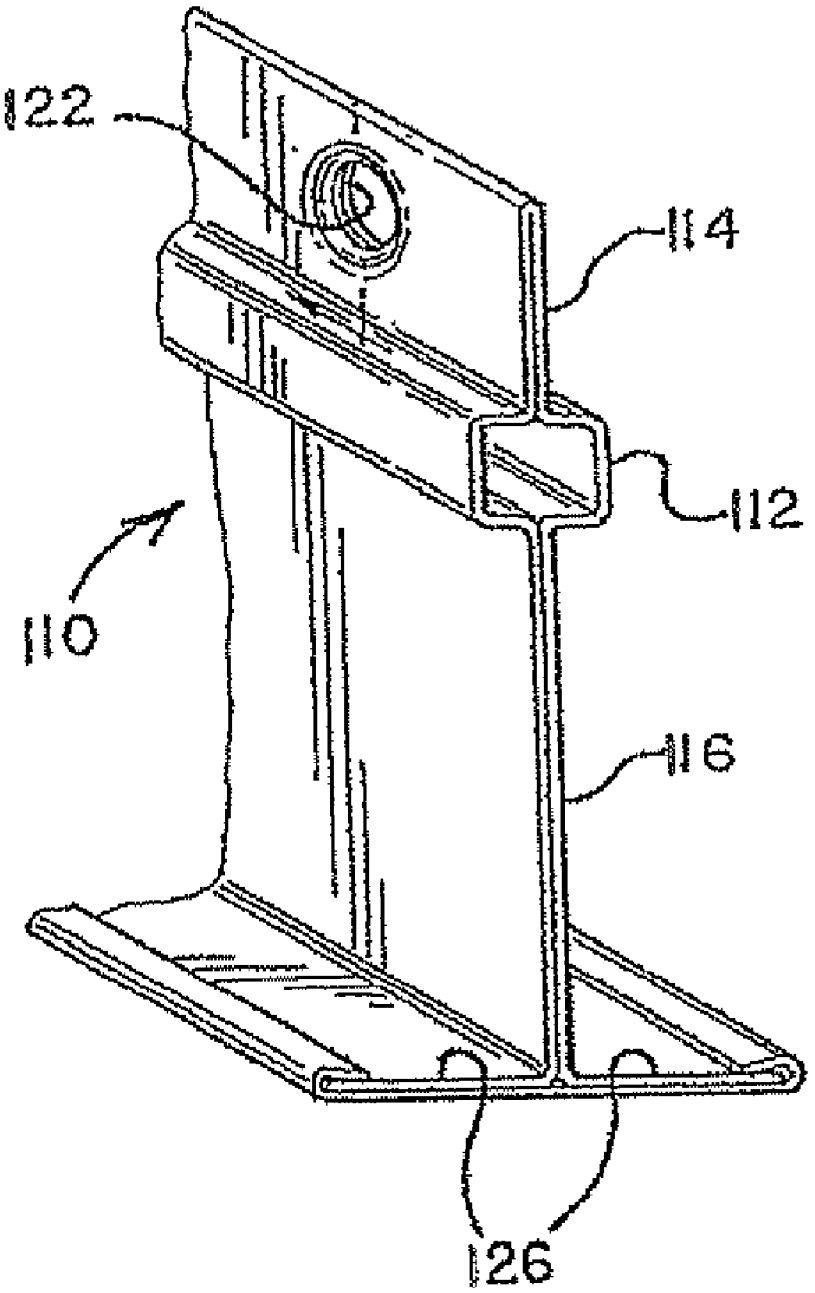


FIG.17



SINGLE STRIP - DOUBLE WEB CEILING GRID MEMBER

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation of U.S. application Ser. No. 11/612,002, filed Dec. 18, 2006 which claims the benefit of the filing date of U.S. Provisional Application Ser. No. 60/751,866, filed Dec. 20, 2005, which is incorporated herein by reference, and which is a continuation-in-part of U.S. application Ser. No. 11/499,035, filed Aug. 4, 2006, which claims the benefit of the filing date of U.S. Provisional Application Ser. No. 60/705,758, filed Aug. 5, 2005.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to a grid member, commonly referred to as a runner or tee, for use in a suspended ceiling system for supporting ceiling tiles. A typical grid tee construction includes a metal strip formed into an upper strengthening bulb or bead, a vertical, downwardly-extending double web, and lower, oppositely-extending flanges. The exposed or lower surface of the flanges is not continuous. That is, there is a transition visible between the flanges where they extend from their respective vertically-extending web member. This transition is often considered to be aesthetically unpleasing, and a cap member is applied to the diverging flanges to cover the transition and provide a more finished appearance to the grid tee, as well as to provide additional resistance to spreading of the flanges. As can be readily appreciated, the addition of the cap member adds to the cost of the grid tee both due to additional material costs and the required roll-forming steps for applying the cap member, and also increases the weight of the grid tee.

[0003] Accordingly, it is an object of the present invention to provide a grid tee for a suspended ceiling system in which the tee is made from a single strip of sheet metal but does not require a cap member for aesthetic or structural reasons.

SUMMARY OF THE INVENTION

[0004] According to the present invention, a runner or tee is roll-formed from a single strip of sheet metal so as to have a generally symmetrical appearance about a vertical center line, with a double vertical web and a double-thickness flange for supporting ceiling tiles. The bottom surface of the flange is continuous across its exposed surface. That is, there is no visible juncture of the opposed flanges with the double web when viewed from below, thus providing an aesthetically more-pleasing appearance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** is a sectional view of a ceiling grid member according to the present invention in which the reinforcing bead includes a fin extending upwardly therefrom.

[0006] FIG. **2** is a first alternate embodiment of the ceiling grid member of FIG. **1** in which the fin is formed with a lock seam.

[0007] FIGS. **3-7** are further alternative embodiments of the grid member of FIG. **2** that differ in the configuration of the lock seam formed in the fin.

[0008] FIGS. **8** and **9** are alternate embodiments of the ceiling grid member according to the present invention in which the upper portion of the vertical web is configured with slots.

[0009] FIGS. **10-13** are alternate embodiments of a ceiling grid member according to the present invention in which the strengthening bead is formed so as to give the cross-section a configuration more like a traditional I-beam.

[0010] FIGS. **14** and **14**A are alternate embodiments of a grid member according to the present invention in which the grid member does not have a strengthening bulb at the upper end thereof.

[0011] FIGS. **15** and **15**A are similar to FIGS. **14** and **14**A except that the grid members include a cap member of affixed to the flanges.

[0012] FIGS. **16** and **16**A are alternate embodiments of the grid members of FIGS. **14** and **14**A in which the flanges are configured to form a bolt slot.

[0013] FIG. **17** is a perspective view of a beam in which the fin includes a hole for receiving the hanger wire for suspending the beam.

DETAILED DESCRIPTION

[0014] Grid members for suspended ceilings are well-known in the art, as exemplified by the runners or tees shown in U.S. Pat. Nos. 4,525,973, 4,549,383, 4,601,153, 4,677,802 and 4,785,595, all incorporated herein by reference and all having the same assignee as the present invention. Such runners or tees are roll-formed from an elongated strip of sheet metal into a configuration having a strengthening bead or bulb at the upper end, a web extending vertically downward from the bead, and opposed flanges at the lower end of the web.

[0015] With reference to FIGS. **1-7**, profiles of grid members, according to the present invention, generally designated **10**, are seen. These grid members **10** have the same structural features as the typical runners or tees, namely, an intermediate vertical web **12** having a bead **14** at its upper end and opposed flanges **16**, **18** at its lower end.

[0016] In keeping with the invention, the grid members **10** are roll-formed from a single elongated strip of sheet metal such that the opposed side edges of the strip are located at the reinforcing bead **14**. This results in the vertical web **12** of the runner **10** having a double thickness and the lower surface of the flanges **16**, **18** being continuous. Specifically, there is no seam between the opposed flanges where they join the vertical web that is observable from below, as is typically found in prior art grid members that have a double thickness vertical web.

[0017] Turning specifically to FIGS. **1-7**, the grid member includes strengthening bead or bulb **14** that preferably, but not necessarily, includes a generally vertically-extending "fin" **20** to provide increased beam height and, thus, increased resistance to bending. Such a reinforcing fin is discussed in copending application Ser. No. 11/499,035, filed Aug. 4, 2006, which is incorporated herein by reference. The fin configuration permits the runner to be formed of thinner material than prior art runners not having such a fin without compromising the beam strength of the runner. This results in a runner that is more economical to manufacture (because less material is required), is easier to handle (particularly in bulk or carton quantities to each runner is lighter in weight), and is easier to cut.

[0018] As shown in FIG. **17**, the fin **114** is preferably provided with a series of spaced holes **122** for receiving the

hanger wire **124** for suspending the assembled grid from the ceiling. Preferably, the series of holes **122** is spaced so that a hole **122** is aligned with apertures in the web of the beam for receiving the cross beams. Having the fin **114**, rather than the web **116**, carry the hanger wire allows for the hanger wire to be aligned with the cross-tee and for the hanger wire to be more tightly wrapped about itself. This, in turn, lessens the likelihood of damaging the edges of the ceiling tiles by the hanger wire when the tiles are dropped into place on the flanges **126** of the runner **110** because there is greater clearance. The greater clearance also facilitates faster installation of the ceiling tile. The hanger holes **122** are also preferably formed as part of an embossment for additional strength. The embossment also provides a tapered hole, which allows easier hanger wire insertion.

[0019] With specific reference to the embodiments of FIGS. **2-7**, the fin **20** includes a lock seam in which at least a portion of the fin **20** is bent back on itself. The lock seam provides increased resistance to torsion and buckling, and thus increased ultimate load resistance. Forming the lock seam "work hardens" the material in the local area, thus enhancing the overall mechanical properties of the runner. With reference to FIG. **2**, the lock seam has a triple thickness of sheet material, with a first edge of the sheet metal strip from which the grid member is formed extending beyond the second edge and the first edge being bent over the second edge. With reference to FIG. **3**, the lock seam has a quadruple thickness, with the first edge and second edge of the sheet metal strip meeting and both edges being bent back over the second edge. The lock seam of the FIG. **4** embodiment also has a quadruple thickness. However, the second edge is first bent downwardly toward the center of the bead and then the first edge is bent over the top of the fold in the second edge. The embodiments of FIGS. **5-7** are similar to that of FIG. **4**, except that the second edge extends into the interior of the bead (FIG. **5**); or the second edge lies against the interior of the bead (FIG. **6**); or the second edge lies against the interior of the bead and the first edge lies against the exterior of the bead (FIG. **7**).

[0020] With reference to embodiment of FIG. **14**, a further alternative for a tee **14** according to the present invention is shown. This alternative does not include a strengthening bulb or bead. As shown in FIG. **14**A, if the tee has no bulb or lock seam at the upper end of the web, a strengthening stitch **22** in the vertical web may be desirable to maintain the structural integrity of the tee. Such a stitch or mechanical interlock **22** is well known in the art, as shown by, e.g., U.S. Pat. Nos. 5,577,313, 5,979,055 and 6,047,511, and also may be used in the embodiments of FIGS. **1-7**. Alternatively, the vertical webs can be welded or otherwise fastened to each other (as by an adhesive).

[0021] While not required, a cap **24** can be applied to the flanges for additional strength or for aesthetic reasons, as seen in embodiments of FIGS. **15** and **15**A, which otherwise are identical to the embodiments of FIGS. **14** and **14**A. In a further alternative, instead of an opposed flanges for supporting ridges of ceiling tiles, the lower portion of the runner can be provided with a bolt slot profile **26**, as seen in the embodiment of FIGS. **12** and **12**A. Previous designs having a bolt slot required the profile to be roll formed from pre-painted strip with finish colors on both sides of the strip. The embodiments of FIGS. **16** and **16**A require the strip to be painted on one side only, thus providing a cost reduction.

[0022] Alternate bulb configurations **14** are seen in the embodiments of FIGS. **8** and **9**. The open lower portions of the bulb permit the use of accessory clips. Specifically, the lower horizontal flange of the bulbs do not extend to the vertical web, creating a slot or a gap **28** that allows the lower end of a clip to be received and retained by the bulb, or otherwise facilitates suspension of the tee. The embodiments of FIGS. **8** and **9** also utilize a stitch **22** through the upper portion of the vertical web **12** to help maintain profile geometry and strength. The stitch **22** is concealed, thus resulting in improved aesthetics of the profile.

[0023] FIGS. **10-13** show further embodiments of grid members **10** according to the present invention in which the strengthening bead **14** is formed to have a generally flat configuration that lies in a plane that is substantially parallel to the plane defined by the flanges **16**, **18**, so as to be more like an I-beam in appearance. This results in the grid members of FIGS. **10-13** being easier to roll form. Further, the distance that the material defining the bead is spaced from the flanges is maximized, thus maximizing the load rating for the grid members while utilizing the least amount of material. Each of the embodiments of FIGS. **10-13** also includes a stitch **22** in their vertical webs **12** to help maintain the integrity of the grid geometry.

[0024] Turning specifically to FIG. **10**, the strengthening bead **14** is formed by bending the edges of the strip so as to be generally perpendicular to the vertical web and then bending the edge downwardly back on itself. The strengthening bead **14** in the embodiment of FIG. **11** is formed similarly, except that the edges are bent upwardly back on themselves, and the edges meet along the vertical center line of the grid member. The strengthening bead **14** in the embodiment of FIG. **12** is similar to that of FIG. **10**, except the edges are bent back on themselves twice, resulting in the strengthening bead **14** to have a triple thickness of sheet material. The strengthening bead **14** in the embodiment of FIG. **13** is similar to that of FIG. **12**, except that the edges are bent upwardly.

[0025] Thus, a single strip ceiling grid member has been provided that meets the objects of the present invention. While the invention has been described in terms of certain specific embodiments, there is no intent to limit the invention to the same. Instead, the invention is defined by the following claims.

1-9. (canceled)

10. A roll-formed grid member for a suspended ceiling made from metal strip, the member being generally symmetrical about an imaginary vertical plane and having a cross-section that includes a lower horizontal flange extending laterally on both sides of the imaginary plane, the flange being formed of said metal strip, a generally vertical stem formed of two layers of said metal strip, one stem forming layer on each side of said imaginary plane, said stem forming layers being immediately adjacent one another in the proximity of said flange so that the edges of ceiling panels can fully rest on said flange adjacent to and on opposite sides of said imaginary plane and being separated from one another at a distance above said flange to form a reinforcing bulb, said stem forming layers being in abutting contact in a zone above said reinforcing bulb, and aligned longitudinally spaced apertures in said layers in said contact zone for receiving loops of suspension wires, said contact zone above said apertures being free of overlying structure of said grid member which would otherwise require the loops of suspension wires to be wider than that required by said contact zone.

11. The roll-formed grid member as set forth in claim **10**, wherein one of said stem forming layers in said zone is folded to form an additional layer in said zone.

12. A grid member of a suspended ceiling comprising a body generally symmetrical about an imaginary central vertical plane and having a cross-section that includes a lower horizontal flange extending laterally on both sides of the central plane and a stem extending vertically above said horizontal flange, the stem including a narrow portion above the flange, a hollow bulb portion wider than and above the narrow portion, and an upper portion above the bulb portion, the upper portion being substantially free of air space whereby it is laterally thinner than said bulb portion, said upper portion having longitudinally spaced holes for receiving suspension wires, the difference in width between the upper and follow stem portions enabling a suspension wire look formed by passing a suspension wire through a hole in the upper portion to be substantially narrower than a suspension wire loop passing through or around said bulb portion.

* * * * *